**Horizon 2020**

**Societal Challenge: Improving the air quality and reducing the carbon footprint of European cities**

**Project: 690105 – ICARUS**

Full project title:

**Integrated Climate forcing and Air Pollution Reduction in Urban Systems**

# D7.4 Interim Icarus Business Plan

**WP7: Motivating citizens towards the vision**

Lead beneficiary: UPCOM

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# 1 Introduction

The purpose of this report is to provide an interim business plan for the commercialization and exploitation activities of the ICARUS Decision Support System (DSS) and of the ICARUS User-Centric Tools (UCT). It aims to analyze as thoroughly as possible at this early stage all the aspects that need to be considered to for that purpose. The information contained in this document should be consequently considered as an initial approach to the commercialization and exploitation activities not binding for the Consortium or the involved partners. A consolidated and final ICARUS Business plan will be delivered by the end of the project on the basis of the information gathered and knowledge acquired during the next 24 months of the project when the main technological products developed will be more mature.

An identical methodology will be adopted for both products: based on the requirements and specifications of the DSS and on the requirements of the UCTs (as defined in D7.1, D7.2 and D7.3) a detailed market analysis will be assessed and its results will be presented in this deliverable. Based on the findings of this analysis and the aforementioned requirements/specifications, we will conduct a SWOT analysis and create a lean canvas for each product. Taking into consideration the potential customers and the target users as well as the estimated operational costs for each solution, we elaborated a preliminary investment plan for the first four years of the exploitation period. Both products being of a rather multifarious nature, there will be a need for a joint exploitation from the involved partners; knowledge and expertise possessed by several participating partners needs to be combined.

# 2 ICARUS Decision Support System

## 2.1 Product description

The ICARUS Decision Support System is targeting policy makers of all levels of administration, NGOs and research institutes whose activities relate to air quality and climate forcing. Policy makers of municipal, regional and national level will be able to use the DSS in order to design and simulate the impact of potential measures. ICARUS DSS will provide policy and measures impact estimations at many levels, namely: emissions, pollutants concentration, population exposure, health impact, monetary evaluation. To this end, it will implement the models developed in the ICARUS research project taking into consideration the particularities of each region, including population activities and habits based on their socioeconomic status. Apart from selecting among predefined policy scenarios of which the different impacts will be calculated, the policy makers will be also able to import their own data for their jurisdictions and to also define their own custom policies they may want to assess. In this light, an essential feature of the DSS will be the ability to evaluate the policy impacts while it is being applied so as to assist stakeholders in the selection, application and evaluation of the available datasets and tools for urban impact assessment in support of air quality and climate change governance at different spatial and temporal scales. Finally, NGOs and researchers may use the DSS to retrieve data and facilitate their research.

Great emphasis is being put into the usability, security, interoperability and scalability of the DSS, which will be accessible through a Web-based Geographical Information System (WebGIS). This will enable access from any computer through a browser, without requiring installation. Two-factor authentication via SMS or e-mail have been predicted, and data import and export will be possible in several formats. Finally, the modular, cloud-based architecture of the DSS ensures its seamless scalability and the possibility for integration of new features.

## 2.2 Users/Potential customers

The potential customers of ICARUS DSS are mainly the regulatory bodies for air quality climate change and health protection of all levels of administration (municipal, regional, national) throughout Europe, with the potential to expand to the rest of the world. NGOs and research institutes are also a target customer group. The major end--user groups of ICARUS DSS are provided below.

- *Cities and local authorities.*
- *Ministries and national authorities.*
- *International organizations and networks,*
- *Large industries.*
- *NGOs.*
- *Scientists.*

- *Consulting companies and individual consultants.*

Detailed information on targeted end-users/potential customers that have already been identified and engaged or will be engaged until the end of the project, can be found in Deliverable D8.3 Stakeholder engagement strategy.

## 2.3 Market Analysis

Air-pollution and GHG monitoring and reduction in urban systems involve products and services encompassing almost all aspects of life and well-being. They address environmental, societal and economic challenges, examples of which include climate change, population health and exposure, urbanization and globalization. Such products and services are increasingly evolved and they are penetrating a large number of sectors including environmental monitoring, health (exposure) and well-being, transportation and automotive, and energy. Given their aforementioned pivotal importance across a wide range of industries and services, **advancements in such system technologies will have a disproportionately large impact, as well as substantial and rapid market uptake**. ICARUS objectives and products address a wide market including environmental monitoring, healthcare and well-being, Internet of Things (IoT) and ICTs.

Over the last decades, environmental awareness has grown rapidly and environmental legislation is introducing and tightening standards in many fields. Moreover, public participation and the "right to know" are mandated by law in many cases, making environmental information an essential element of the policy making process in civil society. In accordance with this trend, environmental information and DSS have emerged over the last decades as important tools for environmental planning and management.

Monitoring facilitates planning and management purposes and includes, apart from sensors, devices and models, systems and tools that integrate information and support decision making. Specifically, DSS technology is expected to bring large market potential for the private sector. The following market descriptions built on the above consensus to further analyze the expected impact of ICARUS in specialized industrial sectors, namely, in environmental and air quality monitoring.

**ENVIRONMENTAL MONITORING MARKET**: The global market of environmental monitoring is expected to reach a value of $20.5 Billion in 2020, growing at a rate of 7.5% over the period 2015-2020 (marketsandmarkets.com 2015). The main drivers of growth in this market are: the growing global population, the emergence of policies and actions to reduce air, soil, and water pollution, increased government funding for pollution reduction and management, an expanding network of environmental monitoring stations, support for environmentally sustainable industries, and the reduction of export tariffs on environmental monitoring technologies in both emerging and developed markets. The growth potential in the sector is moderated by the high cost of monitoring solutions, slow reform of pollution control legislation and tariffs on environmental technologies in some emerging markets (markets and markets, 2015).

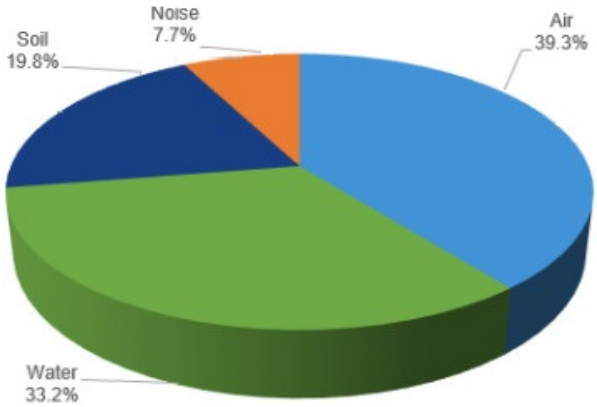


Figure 1: **Global environmental sensing and monitoring market segmentation by application 2019 (Technavio, 2015)**

AIR QUALITY MONITORING MARKET: Apart from the societal impact that air pollution management would have to the general public, air quality monitoring is the main application segment of the global environmental monitoring market as illustrated in Figure 1. Air-pollution and air-pollution control are the main targets of this market and include tools and systems for efficient monitoring and decision making.

The global air quality monitoring market is expected to reach 4.90 Billion by 2022 from USD 3.92 Billion in 2017, at a CAGR of 4.6%. The major factors driving the growth of the air quality monitoring system market include the supportive government regulations for effective air pollution monitoring and control, ongoing initiatives towards the development of environment-friendly industries, increasing public-private funding for effective air pollution monitoring, rising levels of air pollution, and increasing public awareness related to the environmental and healthcare implications of air pollution (marketsandmarkets.com, 2018).

ICARUS DSS is perfectly aligned with markets trends for environmental solutions matching most of the sector drivers related to air pollution and GHG emissions. Key players in the field of policy analysis for air-pollution reduction and climate forcing in urban systems, where ICARUS DSS is positioned, are few and are mainly research and international organizations (e.g. JRC, Universities, Research Organizations) that have developed tools and systems in the framework of R&D projects. The presence of the private sector in the field is very limited and, at this point, only one commercial solution is representing the sector.

The main competitive advantage of ICARUS DSS towards the competition lies to the fact that it targets policies and measures analysis following an integrated approach that includes scenario analysis, multiple objective/criteria optimization and monetary impact evaluation in order to assist policy making processes. An analysis on the identified market barriers and expected measures to overcome those barriers is provided below.

### 2.3.1 Market barriers and expected measures to overcome those barriers

**Porter's 5 forces** of Competitive Position Analysis is the framework used for assessing and evaluating the competitive strength and position of the DSS and user-centric tools developed in the ICARUS project. Porter's 5 forces is used to identify areas of strength and weaknesses of the ICARUS products and understand whether they are potentially profitable and attractive for customers. Porter's 5 forces are:

**Competitive rivalry (Competitors):** Competitors affect the profitability of the market industry. Many competitors, offering undifferentiated products and services, will reduce market attractiveness. Competitors can increase the product improvements or introduce a new product in the market, downward pressure on prices, increase advertising campaigns, and service improvements. Factors that influence the intensity of competition are:

- number of competitors,
- high exit barriers,
- gradual industry growth,
- high fixed or storage costs.

**Threat of new entry (new Entrants):** In general, new entrants desire to gain the market share. New entrants decrease the profitability by introducing new capacity in the market industry and put pressure on the rate of investment, downward pressure on prices, and upward pressure on costs for the purpose of competition. The threat of new entrants depends on the height of the present entry barriers and the lowness of the exit barriers. Significant barriers to new entrants include government barriers, product differentiation, capital requirements, supply-side economies of scale, demand-side benefits of scale, and unequal access to distribution channels.

**Threat of substitution (Substitutes):** Close substitute products that perform the same or similar function increase the likelihood of customers switching to alternatives. Factors that influence the increase of threat of substitutes are: increase of the substitute quality, imposition (introduction) of an attractive price of the substitute, and low switching cost to consumers.

**Supplier power (Suppliers):** Suppliers capture their value by limiting quality or services, prices changes, and shifting costs to the participants. The risk of suppliers power is driven by the: number of suppliers of each essential input; uniqueness of their product or service; relative size and strength of the supplier; and cost of switching from one supplier to another.

**Buyer power (Buyers):** Buyers drive prices down, demanding better quality. This is driven by the: number of buyers in the market; importance of each individual buyer to the organisation; and cost to the buyer of switching from one supplier to another. If a business has just a few powerful buyers, they are often able to dictate terms.

The Porter's 5 forces Analysis for evaluating the competitive strength and market position of the ICARUS DSS is presented below, whereas the analysis for the ICARUS user-centric tools is provided in Chapter 3.3.1. More than 45 projects and their outputs, as well as 20 additional operational products (identified during the ICARUS proposal submission) representing potential competitive solutions to ICARUS have been identified and investigated.

## *PORTER'S 5 FORCES ANALYSIS*

**Competitors:**

**Although a significant number of potential competitive solutions has been identified, the analysis revealed that very few are targeting to address the same objectives and goals as ICARUS, target the same range of end-users, as well as provide the integrated solutions that ICARUS DSS offers. Potential competitors offering DSS with similar features are described below:**

- ***RIAT+ Integrated Assessment Modelling tool developed during the OPERA project.***
  - ***http://www.riatplus.eu/html/eng/home.html***
  - *RIAT+ is a DSS (Decision Support System) developed during the OPERA project (LIFE09 ENV/IT/000092) that helps policy makers and technicians solving a multi-purpose optimization problem to select the most effective air pollution abatement strategies minimizing the intervention measures deployment cost and maximizing result in terms of air quality improvement. In this sense, the RIAT+ tool supports regional/local authorities in the definition, application and evaluation of air quality plans policies, devoted to the reduction of population and ecosystems exposure to air pollutant.*

| | |
|---|---|
| Launch year: | 2013 (First version) |
| Data available for countries: | Italy (Emilia-Romagna, Lombardy), France (Alsace), Belgium (Brussels), Portugal (Porto) |
| Data used in the model: | Measure DB (GAINS), Emission Inventory data Source Receptor (S/R) Function |
| Advantages: | -it can be applied to different regions in Europe<br>- evaluates the efficiency of various types of air quality policies<br>-integrated assessment approach<br>-open-source<br>- free license<br>- user friendly interfaces |
| Disadvantages: | -stand-alone desktop application<br>-input data are required by the user |

| | |
|---|---|
| | -applied only to five cities |

- ***ACEPT-AIR Cost Efficient Policy Tool for reduction of Particulate Matter in AIR***
  - ***http://www.aceptair.prd.uth.gr/index.html***
  - *ACEPT-AIR is an Environment Policy & Governance project (LIFE09 ENV/GR/000289). ACEPT-AIR Policy Tool is an operational platform developed in the form of a software tool that allows the assessment of the relative trends in emissions and observed concentration levels in parallel to the resolved contributions from the different sources so that identification of the results from previous control strategies can be achieved and new measures can be proposed. The policy tool includes databases of concentration levels of particulate matter mass, chemical composition of major and trace substances, emission inventories and source apportionment calculation module for analysis of the results and aims to support policies concerning the reduction of key environmental factors and their interdependencies and to respond to benefits and the problem of particulate matter concentrations in air in a competent way.*

| | |
|---|---|
| Launch year: | 2013 |
| Data available for countries: | Greece (Athens, Thessaloniki, Volos) |
| Data used in the model: | Emission Inventory data for PMs, Field Measurement data, Source Apportionment data, other data (Measures), Parameter data (Regions, Sectors, Key Categories, etc.) |
| Advantages: | - pollution sources recognition and estimation of the contribution of various sources<br>- evaluates the effectiveness of various policy measures already applied<br>-comparison between PM emission scenarios<br>- GUI |
| Disadvantages: | - not available to download (no link exists) - communication is required.<br>-stand-alone desktop application<br>-input data are required by the user |

| | |
|---|---|
| | -applied only to three Greek cities<br>- cost effectiveness is not included |

- ***AirWare air quality management information system for urban and industrial applications (Environmental Software and Services GmbH AUSTRIA)***

  - ***http://www.ess.co.at/AIRWARE/***

  - *AirWare is a model-based real-time and web-based information and DSS for urban and industrial air quality assessment and management. AirWare supports intergrated data management and modeling tools for:*

    - *Compliance monitoring, alerts and alarms, reporting.*
    - *Nowcasts, forecasts and public information, 3G mobile client support.*
    - *Scenario analysis and source apportionment, EIA and SEA studies.*
    - *Multi-citeria emission control optimization, policy design.*

  *Designed primarily for **urban** agglomerations and **industrial** areas, the modular software system integrates monitoring data acquisition and analysis in real-time, emission data bases and an embedded GIS, simulation and optimisation models with coverage from local and near-field to regional scales with a nested grid apporach and several, nested models with different resolution and scope. A rule-based expert system for environmental impact assessment, and a range of decision support tools, including the multi-criteria optimization of cost-effective emission control strategies complement the basic simulation models and associated data bases.*

| | |
|---|---|
| Launch year: | 2010 |
| Data available for countries: | - Poland (Gdansk, Sopot, Gdynia)<br>- Croatia (Sisak)<br>- Iran (Tehran)<br>- South Korea (Seoul)<br>- Cyprus (Limassol, Larnaca)<br>- Malta (Delimara)<br>- Peru (Lima)<br>- Brazil (Porto do Acu)<br>- Austria (Vienna and Lower Austria)<br>- Arabian Gulf (United Arab Emirates) |

| | | |
|---|---|---|
| | | - South Africa (Vaal triangle)<br>- Argentina (Buenos Aires)<br>- Switzerland (Geneva)<br>- Finland (Helsinki)<br>- Italy (Milan, Genoa, Pisa)<br>- Portugal (Lisbon)<br>- Israel (Tel Aviv)<br>- Jordan (Aqaba)<br>- Spain (Vitoria)<br>- Russia (Tomsk)<br>- Japan (Kanto, Morioka) |
| | Data used in the model: | - Emission Inventory data<br>- Field Measurement data,<br>- Air quality and Meteorological data<br>- Other data (e.g. population data, land use, fleet composition, etc.)<br>- GIS data (road network, point sources, cities, buildings, DEM etc.) |
| | Advantages: | - suite of simulation and optimization models<br>- compliance monitoring, alerts and alarms, reporting<br>- multi-criteria optimization, scenario analysis, policy design<br>- embedded GIS<br>- open architecture, modular system<br>- nowcasting and forecasting<br>- mobile client support<br>- available as stand-alone desktop application or bespoke cloud solution |
| | Disadvantages: | - old-fashion, not updated website<br>- complex system, specific expertise is needed<br>- a massive amount of input data are required by the user |

| | |
|---|---|
| | - cost effectiveness/monetary evaluation is not included |

- ***HERON Decision Support Tool (DST)***
  - ***https://heron2017.wordpress.com/heron-dst/***
  - *HERON DST is a tool developed during the HERON project (H2020 grant agreement No 649690) and aims at facilitating policy makers of multi-level governance in EU, to develop and monitor energy efficiency policies in building and transport sectors, through forward-looking socio-economic research. The DST is incorporating Energy Efficiency socio-economic barriers in scenarios development and allows the calculation of the barriers' negative impact, created by the input the end-users behaviour has, on forward looking energy efficiency scenarios and clearly presents the deviation from the expected targets. The barriers in each sector are compared through pairs and the importance of each barrier is presented. The Total Impact is a numerical outcome, expressing the contribution of the concerned barrier in preventing the achievement of EE targets. The numerical outcomes, through mathematical expressions can be incorporated into the initial developed scenarios' inputs and HERON DST provides the deviation and diversification of the initially set targets, allowing correctional modification. Lastly, the tool offers the capacity to examine various combinations, allowing scenario analysis inputs' optimization.*

| | |
|---|---|
| Launch year: | 2017 |
| Data available for countries: | - Greece<br>- Bulgaria<br>- Estonia<br>- Germany<br>- Italy<br>- Serbia<br>- United Kingdom |
| Data used in the model: | - Sector data (Buildings and Transport)<br>- Set of barriers for each sector<br>- Technologies data<br>- Socio-economic data |
| Advantages: | - reflects end-users behaviour<br>- definition and calculation of barriers (social-cultural-educational, economic and institutional) towards EE targets and their negative impact |

| | |
|---|---|
| | - capacity to examine various combinations, allowing scenario analysis inputs' optimization<br>- no need for input data<br>- freely available |
| Disadvantages: | - limited to energy efficiency<br>- focuses in two sectors: Buildings (residential and tertiary) and Transport (passengers and freight)<br>- stand-alone desktop application |

- ***SHERPA tool, JRC***
  - ***http://aqm.jrc.ec.europa.eu/sherpa.aspx***
  - *SHERPA (Screening for High Emission Reduction Potential on Air) tool calculates how changes in emissions – stemming from actions on traffic or residential heating for example – affect air quality. It has been designed by JRC scientists to support public authorities in selecting sound policies to improve air quality in urban areas. The tool is based on the relationships between emissions and concentration levels. SHERPA is configured to work with a predefined set of input data (including emission inventories) that cover the whole of Europe at high (roughly 7x7 km$^2$) resolution. This allows for the simple and straightforward testing of new air quality policies on any given domain in Europe. At the same time, SHERPA can also use locally produced high quality data.*

| | |
|---|---|
| Launch year: | 2016 |
| Data available for countries: | EU-wide |
| Data used in the model: | - Gridded emission inventory<br>- Meteorological input data<br>- A series of AQM simulations on pollutant concentrations<br>Fed by user for regional adaption.<br>- Gridded emission inventory detailed in terms of activity sectors and precursors (left to user choice) over the area of interest<br>- A series of 15-20 simulations performed with an AQM for a series of pre-defined emission scenarios to generate the SRR<br>- A correspondence table matching the user-defined shapefiles with the emission grid cells |

| | |
|---|---|
| Advantages: | - distributed with EU-wide data on emissions and source-receptor models, so that it is very easy to start working on any region/local domain in Europe.<br>- source allocation<br>- spatial flexibility, namely the possibility to assess the contributions from different regions to air quality at any given location<br>- adequate speed, delivering fast responses to guarantee interactivity during the decision support process.<br>- light set-up<br>- allows scenario analysis and testing of their impacts on air quality levels<br>- freely available |
| Disadvantages: | - spatial resolution is 7x7 $km^2$<br>- cost effectiveness/monetary evaluation of measures is not included (need to provide input data in RIAT+ to access cost effectiveness)<br>- stand-alone desktop application |

- ***MURE database***
  - ***http://www.measures-odyssee-mure.eu/***
  - *The Odyssee-Mure project is supported by H2020 programme of the European Commission and is part of the activity of the EnR Club. The project relies on two complementary internet databases, that are regularly updated by the network of national teams (once per year):*
    - *Odyssee database that contains detailed energy efficiency and $CO_2$-indicators with data on energy consumption, their drivers (activity indicators) and their related $CO_2$-emissions.*
    - *Mure database that contains a description, with their impact evaluation whenever available, of all energy efficiency measures implemented at EU or national level.*

  *MURE (Mesures d'Utilisation Rationnelle de l'Energie) database provides information on energy efficiency policies and measures that have been carried out in the Member States of the European Union. The information is accessible by query in the database. The distribution of measure by type can be visualized through radar graph. Finally several facilities enable specific queries.*

| | |
|---|---|
| Launch year: | 2001 (ongoing) |
| Data available for countries: | - EU member countries (28)<br>- Norway<br>- Serbia<br>- Switzerland |
| Data used in the model: | - Sector data<br>- Policy data<br>- Impact data |
| Advantages: | - provides information on energy efficiency policies and measures that have been carried out in the Member States of the EU<br>- offers specific data and policy tools including policies interaction<br>- covers all sectors and end-uses with an homogeneous and harmonised approach and provides an overall picture of the trends and measures by sector<br>- includes several facilities that enable specific queries<br>- provides impact evaluation (whenever available)<br>- multiple benefits analysis of energy efficiency policies and measures<br>- on-line (web) database<br>- no need for input data<br>- free for all EU Ministries, universities and research centres for non-commercial uses |
| Disadvantages: | - limited to energy efficiency<br>- impact evaluation is not available for all measures.<br>- visualization of MURE database outputs and results is restricted to radar graphs and summary tables |

***New Entrants:***

***Potential ICARUS DSS new entrants:*** At the point of submission of this interim business plan, no threats to ICARUS DSS by new entrants have been identified.

***Substitutes:***

***Potential ICARUS DSS substitutes:*** At the point of submission of this interim business plan, no substitute products to the ICARUS DSS integrated solution have been identified. ICARUS DSS follows an unprecedented integrated approach that minimizes the likelihood of customers switching to alternatives. Substitutes performing similar functions to the ICARUS DSS can be identified only per functionality (or groups of functionalities) of the DSS and thus, are not considered as substitute products to the ICARUS solution (since they partially address the user-needs addressed by ICARUS DSS).

***Suppliers:***

***Potential ICARUS DSS suppliers:*** All ICARUS DSS suppliers are members of the ICARUS team/consortium. ICARUS DSS can be characterized as an in-house product. The only external supplier is the cloud server and utilities provider. Cloud services market is very competitive and is developing really fast and, at this point, no threats can be identified regarding limiting the quality or services, price changes, and shifting costs to the buyers.

***Buyers****:*

***Potential ICARUS DSS buyers:***

ICARUS DSS has a very wide audience. Also, the alternatives to which potential buyers can turn to seem rather limited (if not none). Thus, the scenario of having a few powerful buyers that will be able to dictate terms and affect the exploitation regime of ICARUS DSS is considered unlikely. The major end--user groups of ICARUS DSS are provided in Chapter 2.2.

A preliminary comparison of available competitive solutions to ICARUS DSS is illustrated in Table 1. The comparison of Table 1 revealed the advantages of ICARUS DSS towards competitive solutions. These advantages correspond to the strengths of the ICARUS solution and are presented in the SWOT analysis in Chapter 2.4. In brief, the main competitive advantages of ICARUS DSS can be summarized as follows:

- Clear focus on the analysis of Policies and Measures.
- Includes analysis of all related Sectors.
- Follows an integrated approach supporting at minimum scenario analysis, multiple objective/criteria optimization and monetary evaluation.
- Climate change forecast analysis is included.
- Supports Pan European coverage.
- Cloud-based solution.
- Design in a way that provides reasonable usability (with respect to the complex nature of its interface) on mobile phones and tablets

| DSS / Software / Tools | Analysis of Policies and Measures | All Sectors are included | Integrated Approach[1] | Climate change forecast analysis | Pan-European Coverage | Users can integrate their own data sets and policies | User-friendly Interface | Cloud-based | Support display in smartphones/tablets |
|---|---|---|---|---|---|---|---|---|---|
| ICARUS DSS | + | + | + | + | + | + | + | + | + |
| RIAT+ tool | + | + | + | - | - | + | + | - | - |
| ACEPT-AIR tool | + | + | - | - | - | + | ? | - | - |
| AirWare | -[2] | + | -[3] | - | + | + | ? | + | + |
| HERON DST | + | - | + | - | + | + | + | - | - |
| SHERPA tool | + | + | - | - | + | + | + | - | - |
| MURE database | + | + | + | - | + | - | - | - | - |

Table 1: **Comparison of available competitive solutions to ICARUS DSS**

[1] An integrated approach supports at minimum scenario analysis, multiple objective/criteria optimization and monetary evaluation
[2] It provides tools to support policy design but does not analyze policies and measures
[3] No monetary evaluation

### 2.3.2 Potential collaborations

Some of the key players in the field could be considered as potential collaborators in the exploitation of ICARUS products due to their innovative character. At the current point no strategy involving potential collaborations with competitors has been developed. Nevertheless, it is foreseen that synergies with the iSCAPE (improving the Smart Control of Air Pollution in Europe) and CLAiR-CITY (Citizen-led air pollution reduction in cities) Horizon 2020 projects will be investigated in order to provide integrated policy analysis and recommendations.

## 2.4 SWOT analysis

| S<br>STRENGTHS | W<br>WEAKNESSES |
|---|---|
| ▪ Wide audience.<br>▪ Targeted to the analysis of Policies and Measures.<br>▪ All sectors are included.<br>▪ Integrated approach, including policies/measures scenario analysis, multiple objective/criteria optimization and monetary evaluation<br>▪ Climate change forecast analysis<br>▪ Adapts to the particularities of each region<br>▪ Users can integrate their own data sets and policies and/or use the ones already in the system<br>▪ Cloud-based<br>▪ Users can opt for high-speed / high-cost or for low-speed / low-cost<br>▪ Remarkable expertise and know-how inside the consortium | ▪ A fairly high percentage of turnover goes to model / data / cloud fees<br>▪ Partners commitment after the end of the project has to be defined<br>▪ IPRs among the ICARUS partners |
| **O**<br>OPPORTUNITIES | **T**<br>THREATS |
| ▪ Access to international consortia and fora (such us the Covenant of Mayors)<br>▪ A solid base of early adopters (participating cities in ICARUS)<br>▪ Potential collaboration with iSCAPE | ▪ Other potentially competitive solutions<br>▪ Many existing DSSs offer many of the features that ICARUS will<br>▪ Many features |

Table 2: **ICARUS DSS SWOT Analysis**

## 2.5 Investment / Projections

The commercialisation of the DSS is a complex process involving different steps. The first step is to understand the potential market for the DSS, as well as to understand the intellectual properties and various patents. Developing tools as good as possible within the current resource constraints is a next step that should be followed. Moreover, drafting a business plan is vital for the commercialisation procedure. Furthermore, the demonstration of DSS to potentially interested organizations will provide valuable feedback to the process and will reveal potential bugs and/or improvements to be addressed before production phase. Lastly, promoting and disseminating the DSS is a vital step before its actual launch.

Following, we present our preliminary financial plan, based on some assumptions regarding costs and market share. The financial figures provided in this section should be interpreted as first estimates, which may be subjected to modifications during the implementation phase of the project and of the IT tools.

Our business plan is based on two main income sources:

- **License fee**: This is for the use of the DSS and are charged on a monthly basis. It gives access to all the previous results of the DSS, but it does not include the execution of new models (see next point). The cost of the license fee will be 200€ / month.
- **Execution fee**: This is an additional fee that the customer must pay in order to execute a new model. It includes the commission of the data owner (5%) and the cloud expenses (estimated at 40%).

We also base our projected income on the following assumptions, regarding the total licenses and executions:

Assumptions

| | 2021 | 2022 | 2023 | 2024 | |
|---|---|---|---|---|---|
| Projected Executions | 30.00 | 38.00 | 48.00 | 60.00 | Q1 |
| | 32.00 | 40.00 | 51.00 | 63.00 | Q2 |
| | 34.00 | 42.00 | 54.00 | 67.00 | Q3 |
| | 36.00 | 45.00 | 57.00 | 71.00 | Q4 |
| | 132.00 | 165.00 | 210.00 | 261.00 | |
| Projected Licenses | 60.00 | 75.00 | 93.00 | 115.00 | Q1 |
| | 63.00 | 79.00 | 98.00 | 121.00 | Q2 |
| | 67.00 | 83.00 | 103.00 | 128.00 | Q3 |
| | 71.00 | 88.00 | 109.00 | 135.00 | Q4 |
| | 261.00 | 325.00 | 403.00 | 499.00 | |

Table 3**: Assumptions for the DSS financial plan**

So, according to these assumptions, our projected income for the 4 years following the end of the project is as follows:

Income Projection

| | 2021 | 2022 | 2023 | 2024 | |
|---|---|---|---|---|---|
| Execution Fees | 75,000.00 € | 95,000.00 € | 120,000.00 € | 150,000.00 € | Q1 |
| | 80,000.00 € | 100,000.00 € | 127,500.00 € | 157,500.00 € | Q2 |
| | 85,000.00 € | 105,000.00 € | 135,000.00 € | 167,500.00 € | Q3 |
| | 90,000.00 € | 112,500.00 € | 142,500.00 € | 177,500.00 € | Q4 |
| | 330,000.00 € | 412,500.00 € | 525,000.00 € | 652,500.00 € | |
| License Fees | 12,000.00 € | 15,000.00 € | 18,600.00 € | 23,000.00 € | Q1 |
| | 12,600.00 € | 15,800.00 € | 19,600.00 € | 24,200.00 € | Q2 |
| | 13,400.00 € | 16,600.00 € | 20,600.00 € | 25,600.00 € | Q3 |
| | 14,200.00 € | 17,600.00 € | 21,800.00 € | 27,000.00 € | Q4 |
| | 52,200.00 € | 65,000.00 € | 80,600.00 € | 99,800.00 € | |
| Totals | 382,200.00 € | 477,500.00 € | 605,600.00 € | 752,300.00 € | |

Table 4**: Income projection for DSS**

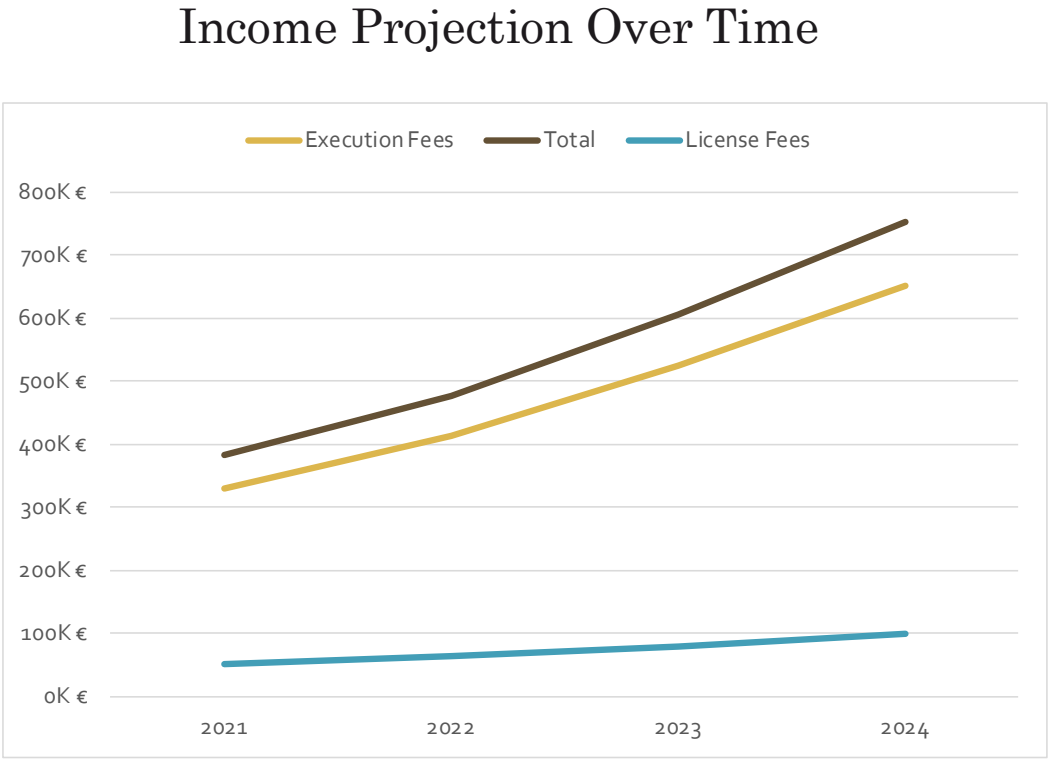


Figure 2**: Projected income over time for DSS**

Regarding the expenses of the DSS, we identify 3 different types of expenses:

- **Execution expenses**: These include the cost for the execution of the models, as well as the license fee for the use of any non-open data.
- **Technical support expenses**: These expenses include issue tracking, bug fixing and even the implementation of new features. We assume 2 developers working full-time on technical support.
- **Operational expenses**: These are regular recurring operational expenses.

Expenses Projection

| | 2021 | 2022 | 2023 | 2024 | |
|---|---|---|---|---|---|
| Execution Expenses | 33,750.00 € | 42,750.00 € | 54,000.00 € | 67,500.00 € | Q1 |
| | 36,000.00 € | 45,000.00 € | 57,375.00 € | 70,875.00 € | Q2 |
| | 38,250.00 € | 47,250.00 € | 60,750.00 € | 75,375.00 € | Q3 |
| | 40,500.00 € | 50,625.00 € | 64,125.00 € | 79,875.00 € | Q4 |
| | 148,500.00 € | 185,625.00 € | 236,250.00 € | 293,625.00 € | |
| Texchical Support Expenses | 15,000.00 € | 15,000.00 € | 15,000.00 € | 15,000.00 € | Q1 |
| | 15,000.00 € | 15,000.00 € | 15,000.00 € | 15,000.00 € | Q2 |
| | 15,000.00 € | 15,000.00 € | 15,000.00 € | 15,000.00 € | Q3 |
| | 15,000.00 € | 15,000.00 € | 15,000.00 € | 15,000.00 € | Q4 |
| | 60,000.00 € | 60,000.00 € | 60,000.00 € | 60,000.00 € | |
| Operational Expenses | 7,500.00 € | 7,500.00 € | 7,500.00 € | 7,500.00 € | Q1 |
| | 7,500.00 € | 7,500.00 € | 7,500.00 € | 7,500.00 € | Q2 |
| | 7,500.00 € | 7,500.00 € | 7,500.00 € | 7,500.00 € | Q3 |
| | 7,500.00 € | 7,500.00 € | 7,500.00 € | 7,500.00 € | Q4 |
| | 30,000.00 € | 30,000.00 € | 30,000.00 € | 30,000.00 € | |
| Totals | 238,500.00 € | 275,625.00 € | 326,250.00 € | 383,625.00 € | |

Table 5**: Expenses projection for DSS**

The following figures show the projected expenses over time, along with a breakdown of the expenses according to their category.

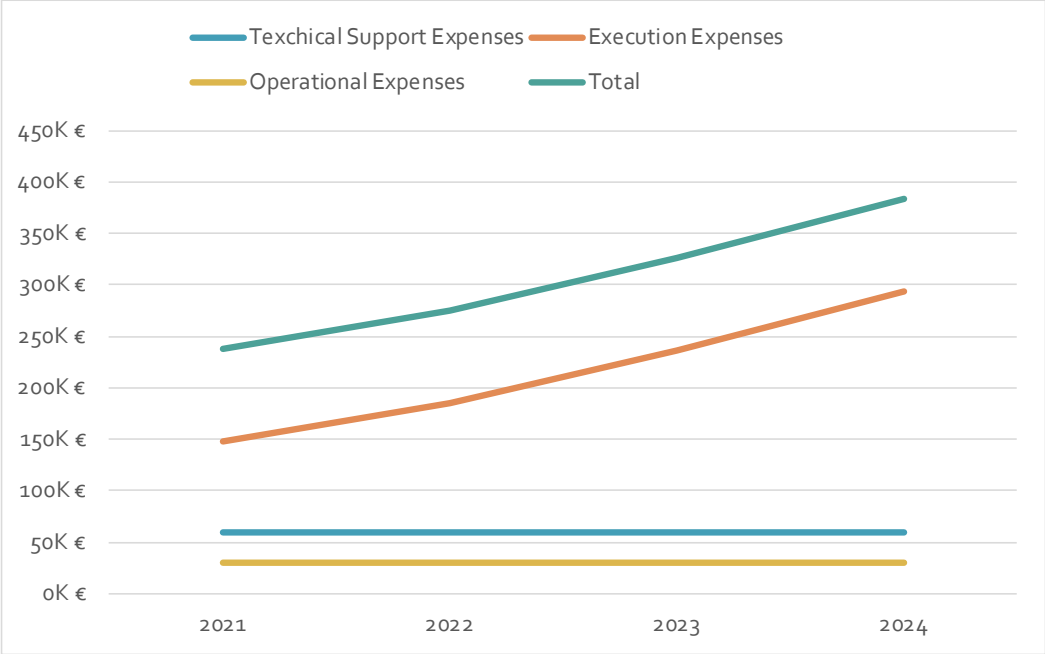


Figure 3**: Projected expenses over time for DSS**

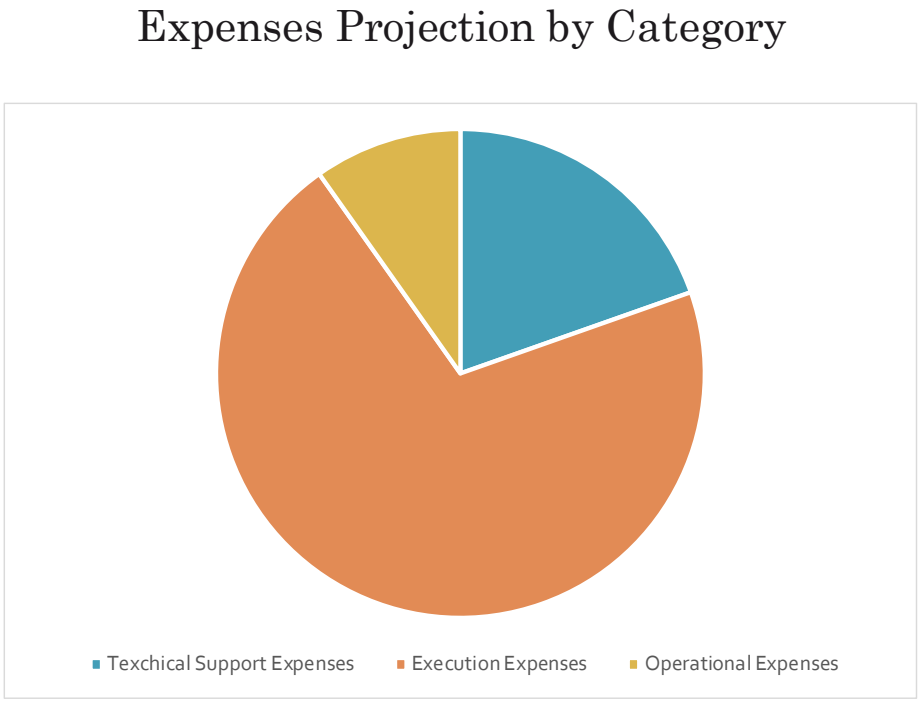


Figure 4**: Projected expenses by category for DSS**

Finally, having estimated the gross income and the total expenses, we can conclude on the following net profit, as summarized by the next table and figures:

Summary

| | 2021 | 2022 | 2023 | 2024 |
|---|---|---|---|---|
| **Gross Income** | **382,200.00 €** | **477,500.00 €** | **605,600.00 €** | **752,300.00 €** |
| Execution fees | 330,000.00 € | 412,500.00 € | 525,000.00 € | 652,500.00 € |
| License fees | 52,200.00 € | 65,000.00 € | 80,600.00 € | 99,800.00 € |
| **Total Expenses** | **238,500.00 €** | **275,625.00 €** | **326,250.00 €** | **383,625.00 €** |
| Execution expenses | 60,000.00 € | 60,000.00 € | 60,000.00 € | 60,000.00 € |
| Tchnical support expenses | 148,500.00 € | 185,625.00 € | 236,250.00 € | 293,625.00 € |
| Operational expenses | 30,000.00 € | 30,000.00 € | 30,000.00 € | 30,000.00 € |
| **Net Profit** | **143,700.00 €** | **201,875.00 €** | **279,350.00 €** | **368,675.00 €** |

Table 6**: Net profit for DSS**

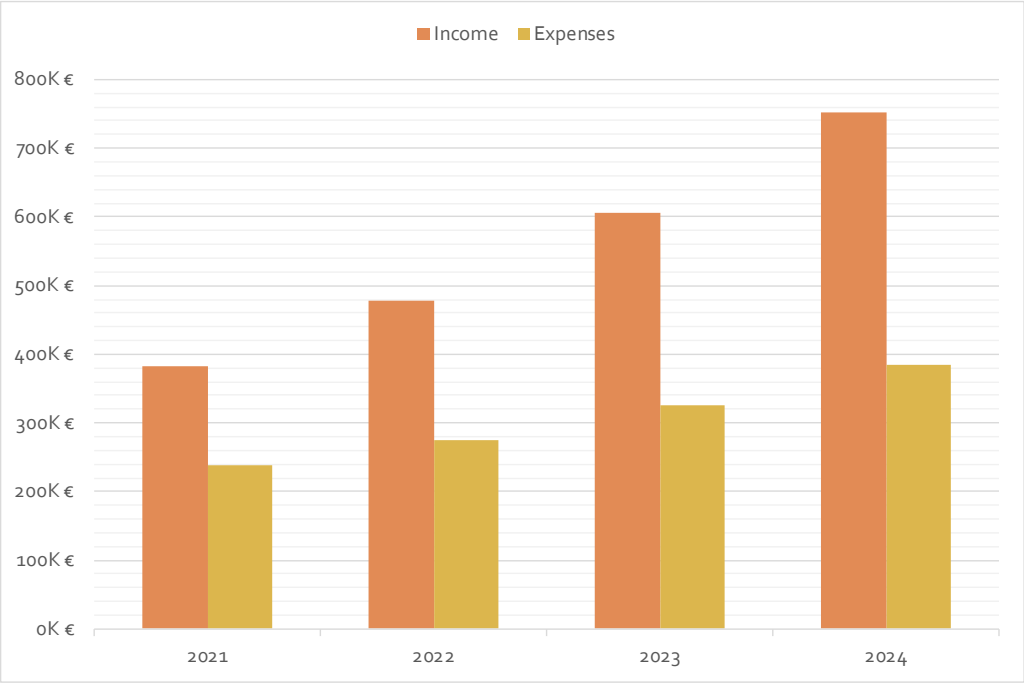


Figure 5**: Income vs expenses for DSS**

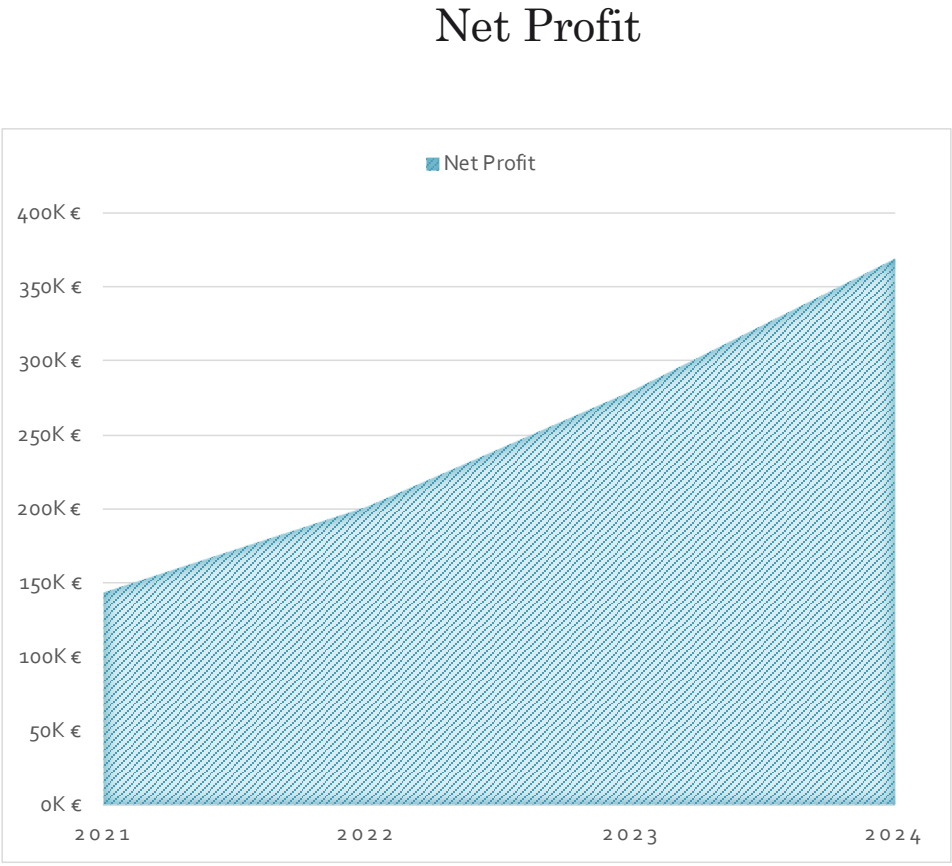


Figure 6: **Net profit for DSS**

## 2.6 Strategy and implementation of the exploitation plan

### 2.6.1 Lean Canvas

<table>
<tr>
<td rowspan="2">Problem<br>- Policy makers cannot have a quantitative impact estimation of their policies.<br>- Impact cannot be estimated in several levels (AQ, exposure, health, financial)<br>- Policies cannot be evaluated and adapted based on their impact.</td>
<td>Solution<br>- Provide measurable impact estimations.<br>- Take into account societal behaviors<br>- Keep track of policy conformance and results.</td>
<td rowspan="2">Unique Value Proposition<br>- Take into account the particularities of each region (geographical, socio-economic etc.)<br>- Provide health impact and the cost related to it<br>- Provide policy evaluation impact metrics, so that adaptations be possible</td>
<td>Unfair Advantage<br>- Possible collaboration with other tools (iSCAPE)</td>
<td rowspan="2">Customer Segments<br>- Municipal, regional and national authorities<br>- NGO’s<br>- Research institutes<br><br>Early adopters<br>- ICARUS Participating cities<br>- Regions with serious AQ problems</td>
</tr>
<tr>
<td>Key Metrics<br>- Number of licenses bought by authority entities, NGOs etc.<br>- Number of visitors consulting the registration-free functionalities of the DSS.</td>
<td>Channels<br>- International consortia and fora (such us the Covenant of Mayors)</td>
</tr>
<tr>
<td colspan="3">Cost Structure<br>- Fixed: Salaries<br>- Variable: processing power and storage capacity; users help desk</td>
<td colspan="2">Revenue Streams<br>- Service licenses<br>- Processing and storage resources<br>- Societal impact</td>
</tr>
</table>

# 3 ICARUS User-Centric tools

## 3.1 Product description

The user-centric tools consist of a web-based platform and mobile application(s) created to track and analyze the individual (user's) activities and their impact on the air quality and climate change. The tool combines information about GHG and air pollution emissions based on aggregated input data analysis, data collections, models, etc. The platform is designed in a way that offers easy operations and quick information accessibility. The user-centric tools are mainly focused on the end-users (i.e. citizens) taking into consideration the user's needs and limitations.

Their purpose is to raise awareness of citizens on AQ and climate change in urban environment by promoting a more environment-friendly behavior through citizen engagement and behavioral change. We will investigate ways of doing this through ethical rewards such as health and air quality impact combined with gamification for users that give up habits with high environmental footprint. The possibility of offering rewards such as discounts, offers and promotions to users that will prove to have achieved a milestone can be offered by corporations and/or administrative bodies will be also considered.

## 3.2 Users/Potential customers

The principal target users of ICARUS user-centric tools are citizens of large cities, cities with on-going policy related environmental programs. Potential customers are large companies with an operational program on Corporate Social Responsibility or certified under ISO 14001, companies with a large fleet and tourist operators. Furthermore, companies providing environmental-friendly solutions, such as public transport operators and (electric) bicycle manufacturers will have a common interest to invest in promotions via the ICARUS user-centric tools. Finally, administrative authorities (municipal and regional) that want to promote environment-friendly behavior in their jurisdiction are also potential customers.

## 3.3 Market Analysis

At the beginning of the valuation process of a product, investigation of the market and start-up strategy is necessary. In order to achieve qualitative and quantitative assessment of particular market, market analyses are indispensable part of any business plan. The focus of a market analysis is to determine the attractiveness of particular market or market's product. The market analysis examines the various costumer segments and buying patterns. Its focus is to understand (identify) the evolving opportunities and threats in the market related to the product. Important segments of the market analysis are: market size and market growth rate, market profitability, market trends, industry cost structure, key success factors and distribution channels.

The market analysis for the ICARUS product should contain:

- Market segmentation
- Strengths of the product
- Weaknesses of the product
- Target Audience
- Competition

### 3.3.1 Market barriers and expected measures to overcome those barriers

***PORTER'S 5 FORCES ANALYSIS***

***- 5 key forces in achieving an attractive and potentially profitable product***

***Competitors:***

***Potential competitors offering user-centric tools with similar features (tracking, analysing the individual activities, calculating their impact on the air quality and climate change):***

- ***CoolClimate Carbon Footprint Calculator of the University of California at Berkeley, USA***

  Website: ***http://coolclimate.berkeley.edu/calculator***

  *Tool developed in the Renewable and Appropriate Energy Laboratory (RAEL) in the Energy and Resources Group and the Department of Nuclear Engineering based at the University of California, Barkley. CoolClimate provides tools and programs to promote, educate and motivate individuals and organizations to take action in making low-carbon choices to reduce greenhouse gasses emissions.*

| | |
|---|---|
| Launch year: | 2015 |
| Data available for countries: | United States of America |
| Data used in the model: | GHG emission factors from CEDA 3.0 Climate-Comprehensive Environmental Data Archive for Economic and Environmental Systems Analysis |
| Model's advantages: | -visually attractive website<br>-easy accessible calculator<br>-the input of individual consumption data is divided into different categories |

| | | |
|---|---|---|
| | | - a detailed overview of the various possibilities for the individual total $CO_2$ reduction plan<br><br>-provides comparison of the results with the average household in the United States with similar income |
| | Model's disadvantages: | -an average complicated model for individual users<br><br>-numerous input data required, divided into five categories i.e. intro, travel, housing food, shopping (requires input data for transportation-personal, public and air traveled miles per year, energy and fuel use per year, average daily food consumption and services and goods expenses per month)<br><br>-calculates only the total $CO_2$ emission per year<br><br>-applied only to U.S .countries |

- ***Carbon Footprint Ltd. UK***

  Website: ***https://www.carbonfootprint.com/***

  *Carbon Footprint multi-language software developed to raise awareness in reducing the carbon emission. The software disposes with carbon calculation tools, $CO_2$ reduction and energy costs calculations available for individuals, small and large businesses and also enables product emission assessment.*

| | |
|---|---|
| Launch year: | 2015 |
| Data available for countries: | All |
| Data used in the model: | -International Energy Agency- IEA database<br><br>-US Environmental Protection Agency (EPA)<br><br>-US Department for Energy (DOE)<br><br>-DEFRA Guidelines for Reporting Greenhouse Gas (GHG) emissions<br><br>-Green House Office- Australia<br><br>-Canadian Standards Association (CSA) GHG Registries |

| | | |
|---|---|---|
| | Model's advantages: | - easy accessible calculator<br><br>-the site gives rich information about $CO_2$ reduction, Carbon offsetting, Climate Changes<br><br>-Direct selection of individual, business (small and large) and products online carbon footprint calculator<br><br>- Multi-lingual calculator<br><br>-the input of individual consumption data is divided into following independent categories: house, flights, car, motorbike, bus & rail and secondary (carbon footprint calculator of various personal activities and costs) |
| | Model's disadvantages: | -calculates only the total $CO_2$ emission per year or per chosen period<br><br>-individual total $CO_2$ reduction plan is not implemented directly to the calculation results, but separately in the $CO_2$ reduction section |

- ***CARMACAL- carbon management tool for tour operators, NL***

  Website: ***https://www.cstt.nl/carmacal***

  *It is an application that allows tour operators and other organizations to measure the impact of their tour packages and trips on the carbon emission level. The carbon management tool measures the impact of the total journey including the tour location activities.*

| | |
|---|---|
| Launch year: | (not found) |
| Data available for countries: | EU countries, no information about other |
| Data used in the model: | (not found) |
| Model's advantages: | -YouTube tutorial to help users https://www.youtube.com/watch?v=RSTbFJjGVYI&feature=youtu.be<br><br>-three topic categories to fulfill: general information of the product (code, name and country of the destination, period, etc.), transport to the destination (air, train, car) and accommodation (location and type of accommodation) |

| | |
|---|---|
| | -choice of various activities available to fulfill for separate days<br><br>- additionally, the transport section can calculate the emission of the separate daily activities including the information of the locations, number of travelers and the traveled distance<br><br>-the results are made for the total calculation of the carbon footprint as well as for the separate daily calculations<br><br>-compares the amount of the emission from the transport to the touristic destination if is made by plane, car or train |
| Model's disadvantages: | -the model is not free available online (tour operators and other parties can purchase annual user licenses) |

- ***WWF'S Footprint Calculator, UK***

  Website: ***http://footprint.wwf.org.uk/***

  *It is an application that calculates the individual carbon emission built up from the energy used for transportation, electricity, food, etc. and compares the results with other individuals and countries. The application is customized mainly for users from the United Kingdom. The WWF'S calculator is created by the Stockholm Environment Institute at the University of York and the University of Leeds.*

| | |
|---|---|
| Launch year: | 2007 |
| Data available for countries: | United Kingdom |
| Data used in the model: | UK's office for National Statistics<br><br>Eora MRIO database<br><br>Shrink That Footprint<br><br>Defra<br><br>Energy Savings Trust |
| Model's advantages: | - easy accessible calculator<br><br>-easy to use and attractive website<br><br>-quiz structure of the required input data |

| | |
|---|---|
| | -does not require exact input information, offers more basic options for use<br><br>-the input of individual consumption data is divided into four set of questions: food, travel, home and stuff<br><br>-compares the result with the UK average and world average annual carbon emission |
| Model's disadvantages: | -calculates only the carbon footprint<br><br>-applied only for UK users<br><br>-requires registration for reduction tips |

- ***EPA's Household Carbon Footprint Calculator, United States Environmental Protection Agency, USA***

  Website: ***https://www3.epa.gov/carbon-footprint-calculator/***

  *The EPA's footprint calculator is created to estimate the footprint of individuals by using U.S. average values. The household's carbon footprint is based on home, waste and transportation energy use of individuals in the U.S.*

| | |
|---|---|
| Launch year: | (not found) |
| Data available for countries: | United States of America |
| Data used in the model: | -EPA<br><br>-Federal Register US<br><br>-Intergovernmental Panel on Climate Change (IPCC)<br><br>-Federal Highway Administration (FHWA)<br><br>-U.S. Energy Information Administration (EIA)<br><br>-U.S. Department of Energy |
| Model's advantages: | -website with good clarity<br><br>- while filling in the input user's data, there is a continuous overview of the current results<br><br>-the input of individual consumption data is divided into three sections: Home Energy, Transportation and Waste |

| | | |
|---|---|---|
| | | -next to each field that has to be filled up is a brief explanation where average consumption values and average annual $CO_2$ emission for a household and the number of persons living in it, for the US standards is additionally added<br><br>-an additional component "Reduce Your Emission" is part of every section which gives direct options to the user for the actions that can be taken<br><br>- the result are compared with the U.S. annual average $CO_2$ emission<br><br>- estimations of the $CO_2$ reduction and money savings for the chosen reduction actions are additionally calculated in the results section |
| | Model's disadvantages: | -ZIP Code is demanded to enter the calculator<br><br>- applied only for U.S. users<br><br>-calculates only the $CO_2$ emission |

- ***Carbon Footprint Estimate, The Nature Conservancy, USA***

  Website: *https://www.nature.org/greenliving/carboncalculator/index.htm*

  *Calculates the annual average $CO_2$ emission of individuals in households in the US countries. The carbon footprint calculator is developed by the University of California and the CoolClimate Network.*

| | |
|---|---|
| Launch year: | (not found) |
| Data available for countries: | United States of America |
| Data used in the model: | Econometric analysis of national household survey, U.S. |
| Model's advantages: | -the input of individual consumption data is divided into following categories: Travel, Home, Food, Shopping<br><br>-in every category is graphical comparison of the user's household footprint and similar households |

| | |
|---|---|
| | -the result of the calculated total footprint is in percentage terms compared with the average U.S. footprint<br><br>-"Take Action" category offers a list of numerous options to $CO_2$ reduction |
| Model's disadvantages: | -ZIP Code is needed to start the calculations<br><br>- applied only for U.S. users<br><br>-calculates only the $CO_2$ emission<br><br>-explanations are needed in each category<br><br>-not simple enough to use i.e. some values and fields to fulfill are not comprehensible |

- ***Emission Calculator, Cleaner + Greener Leonardo Academy, USA***

  Website: *http://www.cleanerandgreener.org/resources/pollutioncalculator.html*

  *The calculator is created for U.S. users to calculate the emission of $CO_2$, $CH_4$, $N_2O$, $NO_x$, $SO_2$ and Hg based on estimations of annual electricity and natural gas usage.*

| | |
|---|---|
| Launch year: | 2013 |
| Data available for countries: | United States of America |
| Data used in the model: | EPA |
| Model's advantages: | -calculation of $CO_2$, $CH_4$, $N_2O$, $SO_2$, $NO_x$, Hg |
| Model's disadvantages: | -poorly looking website<br><br>-only two input data needed to fulfill: annual electricity usage, annual natural gas usage<br><br>-looks unconvincingly because only two values are needed to be entered<br><br>-applied only for U.S. users |

- ***Calculator for greenhouse gases and common air contaminants, Environment Canada (EC), Canada***

  *Website: https://www.canada.ca/en/environment-climate-change/services/environmental-funding/tools-for-applying/calculator-greenhouse-gases-air-contaminants.html*

  *The tool is created for environmental groups and other users to estimate the GHG and Criteria Air Contaminants emission reduction according to the actions taken to reduce electricity use, fuel oil use, natural gas use, water use, fine paper use and recycle fine paper and increase recycling of mixed material. The tool is intended to be used to calculate emission reduction for Environment Canada funded project activities. The calculator is available in Excel format.*

| | |
|---|---|
| Launch year: | (not found) |
| Data available for countries: | Canada |
| Data used in the model: | Canada's GHG Inventory<br>Canada's Air Pollutant Emission Inventory |
| Model's advantages: | -calculation of the GHG emissions<br>-calculation of the criteria air contaminants<br>-different entry categorization depending on the reduction choice of: Reduce Space & Water Heating, Reduce Electricity Use, Reduce Natural Gas Use, Reduce Fuel Oil Use, Reduce Water Use, Increase Recycling of Mixed Material, Reduce Fine Paper Use, Recycle Fine Paper |
| Model's disadvantages: | -the calculations of GHG and CAC emissions are directed only for the purpose of the Environment Canada funded project activities<br>-Excel format<br>-complexed to use<br>-calculates only the GHG and CAC emission reduction per year from the applied activities |

- ***Website: Carbon Footprint Calculator - Carbon Independent, independent authors from the UK***

  Website: *http://www.carbonindependent.org*

*The calculator is created by an independent group of authors to give information on the $CO_2$ emissions and the climate change. The leading authors are Ian Campbell (statistician in medical and related fields) and Margaret Campbell (environmental projects developer). The calculator puts an accent on the reduction of the fossil fuels use and the possibilities of the actions that can be taken in the fossil fuels replacement. The actual version, Version 3 is published in 2008 and was updated with coal, bottled gas, wood and newer "green" electricity tariffs in 2013. The first version was published and superseded in 2007.*

| | |
|---|---|
| Launch year: | 2008 (Version 3) |
| Data available for countries: | All<br>*Note: The data used in the calculator is mostly from the UK* |
| Data used in the model: | -Department for Environment, Food and Rural Affairs, UK<br>-National Energy Foundation, UK<br>-Department for Transport journey planer, UK<br>-Department for Business, Energy & Industrial Strategy, UK<br>-Office for National Statistics, UK<br>-American Physical Society Sites-Energy Units<br>-EMEP/CORINAIR Emission Inventory Guidebook 2001 |
| Model's advantages: | - website with good clarity and data is easy reachable<br>-the input of individual consumption data is divided into two sections: Section 1 (household) and Section 2 (personal)<br>-it has a questionnaire structure with selection of few options<br>- next to each question that has to be filled up is a note where are given explanations on units, $CO_2$ emission factors and $CO_2$ emission reduction<br>- the results are compared with the world average, UK average, USA, Sweden, Switzerland, China, India, Tanzania $CO_2$ emission |
| Model's disadvantages: | -calculates only the $CO_2$ emission |

| | |
|---|---|
| | -the comparison with other countries is based only on $CO_2$ emission, except the UK average emission which includes adjustments for GHG other than $CO_2$ and imports |

- ***My Climate $CO_2$ calculators, myclimate shape our future, Switzerland***

  Website: *https://www.myclimate.org/*

  *My Climate $CO_2$ calculators are created by an international non-profit organisation in Switzerland. The myclimate website offers $CO_2$ emission calculations in separate carbon footprint calculators and carbon offset projects.*

| | |
|---|---|
| Launch year: | 2008 |
| Data available for countries: | All |
| Data used in the model: | (not found) |
| Model's advantages: | -calculators operating separately for calculation of the $CO_2$ emissions: Flight, Car, Cruise, Footprint, Household, Company and Event<br><br>-easy accessible calculators<br><br>-brief explanation in every separate calculator (section)<br><br>-calculator for private events<br><br>-direct overview of the calculated $CO_2$ emission<br><br>-compensation in climate projects in developing countries of currency values (EUR, USD, CHF, GBR) derived from the individual contribution to $CO_2$ emission, resulted and calculated by myclimate calculators<br><br>- comparison of the calculated individual $CO_2$ emission with the average annual $CO_2$ emission produced by EU citizen<br><br>-comparison of the calculated individual $CO_2$ emission with the maximum amount of $CO_2$ a person should produce per year to curb the contribution to climate change |

| | |
|---|---|
| Model's disadvantages: | -calculates only the $CO_2$ emission |

- ***BreezoMeter Air Quality Index, Israel***

  *Website*: *https://breezometer.com/*

  *Mobile App: https://play.google.com/store/apps/details?id=app.breezometer&hl=en*

  *Founded by Technion, Israel Institute of Technology graduates Ran Korber, Ziv Lautman and Emil Fisher. The tool provides location based air quality data and informs the users about the level of the air pollution at a specific location. The users can check the air quality index and the possible air pollution exposure at a street level through real-time notifications, air quality forecasts, pollution heat maps, historical air analysis, and reports. The tool also includes health and quality life advising.*

| | |
|---|---|
| Launch year: | 2012 |
| Data available for countries: | 29 countries up to date |
| Data used in the model: | -Satellites Data<br>-Raw Data from Air Quality Monitors<br>-Traffic Data<br>-Meteorological Data |
| Model's advantages: | -visually attractive website and mobile application<br>-easy to use and understand<br>-fast location determination<br>-brief advices followed by the momentary detected AQI for indoor and outdoor exposure, children, health sensitive people and sport activities<br>-information about the AQI (0 to 100) on the chosen location and local AQI (1 to 6)<br>-website:<br>• CO, $NO_2$, $O_3$, $PM_{10}$, $PM_{2.5}$, $SO_2$ momentarily concentration data at the chosen location. Additionally, the dominant air pollutant is pointed out |

| | |
|---|---|
| | • information about the detection of pollen [grains/$m^3$] in the air<br><br>-number of installers: 100,000 – 500,000 |
| Model's disadvantages: | -differences in the website and the mobile application<br><br>- information about the concentration level of CO, $NO_2$, $O_3$, $PM_{10}$, $PM_{2.5}$, and $SO_2$ in the mobile app was not found<br><br>- calculates only the air pollutants emission, GHG emission is not included |

- ***hackAIR mobile app with current and historical air quality, EU***

  Website: https://play.google.com/store/apps/details?id=gr.draxis.hackair

  *HackAIR provides reliable information on the current and historical air quality, based on official data and measurements from users, and helps you make informed decisions to protect yourself. The Mobile app does not estimate ambient air quality impact and GHG emissions based on personalized activities.*

| | |
|---|---|
| Launch year: | 2018 (mobile App) |
| Data available for countries: | Belgium (Brussels)<br><br>Germany (Berlin)<br><br>Greece (Athens and Thessaloniki)<br><br>Norway (Oslo)<br><br>United Kingdom (London) |
| Data used in the model: | -EEA's official Air Quality Index<br><br>-public data sources provided by government<br><br>-photographs of the sky |
| Model's advantages: | -visually attractive website and mobile application<br><br>-four options to contribute air quality measurements (mobile phone pictures, low tech measurements, open hardware sensors and open air quality datasets) |

| | |
|---|---|
| | -number of installs:500 - 1000 |
| Model's disadvantages: | -registration request to use the web and mobile applications<br><br>-available only for the listed cities above<br><br>-users from others cities then the listed ones can access the application but cannot receive accurate air quality data<br><br>-it looks more difficult to use compared to other apps<br><br>-not found information about the concentration level of the air pollutants or GHG (except for $PM_{10}$ and $PM_{2.5}$ that the sensor measures, stated in the FAQ section of the Hackair website) |

- ***EuropeAir – Air Quality Europe, EU***

  *Website: http://airindex.eea.europa.eu/*

  *Mobile App:*
  *https://play.google.com/store/apps/details?id=com.girosystem.europeair&hl=en*

  *The tool provides information about the air pollutants concentration based on the geographical location of the user. EuropeAir makes possible for the users to choose specific monitoring station and check the last air quality data statement. The tool is created by 4sfera Innova with European Environmental Agency for the EEA member countries citizens.*

| | |
|---|---|
| Launch year: | 2013 |
| Data available for countries: | European Environment Agency (EEA) member countries |
| Data used in the model: | EEA |
| Model's advantages: | - visually attractive mobile application<br><br>-the App offers a station type choice (Background, Traffic, Industrial, and All) and air quality information choice (Index, $O_3$, $PM_{10}$, $PM_{2.5}$, $NO_2$)<br><br>- direct map access and current available data for all European countries |

| | | |
|---|---|---|
| | | - five statements of the current air quality: Good (blue color), Fair (green color), Moderate (yellow color), Poor (red color), Very Poor (dark red color)<br><br>-current available air quality data from the measuring stations for AQI, $O_3$, $PM_{10}$, $PM_{2.5}$, $NO_2$ including data for the last updated time, station type and station ID<br><br>-users can add in the menu favorite station and follow the station's air quality data<br><br>-explanations about the AQI rate, the measured data, air pollution, ozone, nitrogen dioxide, articulate matter, and the App<br><br>-languages: English, Spanish<br><br>-number of installs: 1000 - 5000 |
| | Model's disadvantages: | -information about the air pollutants emission, GHG emission is not included |

- ***Air Quality: Real time AQI, China***

  *Website: http://aqicn.org/map/world/#@g/3.478/8.6133/2z*

  *Mobile App: https://play.google.com/store/apps/details?id=com.insdio.aqicn.airwidget.Asia&hl=en*

  *The tool provides AQI information for users in more than 60 countries in the world. The overall AQI is updated every hour and is based on the air pollutants concentration level of $O_3$, $PM_{10}$, $PM_{2.5}$, $NO_2$, $SO_2$ and CO. The Air Quality Index App is a worldwide team project with a base team location in Beijing, China.*

| | |
|---|---|
| Launch year: | 2007 |
| Data available for countries: | All |
| Data used in the model: | -World EPAs (Environmental Protection Agencies)<br><br>-US Embassy measurements for Beijing, Shanghai, Chengdu, Guangzhou and Shenyang<br><br>-State Environment Protection Agency (SEPA) for China |

| | | |
|---|---|---|
| | Model's advantages: | -visually satisfying look of the App and the website<br><br>-information about the hourly measured AQI, $PM_{10}$, $NO_2$, $SO_2$, $O_3$ from the nearest monitoring station and current meteorological information i.e. temperature, pressure, humidity and wind flow velocity<br><br>- six statements of the current air quality: Good AQI 0-50 (green color), Moderate AQI 50-100 (yellow color), Unhealthy for Sensitive Groups AQI 100-150 (orange color), Unhealthy AQI 150-200 (red color), Very Unhealthy AQI 200-300 (purple color), Hazardous AQI 300+ (dark red color)<br><br>-hourly measured values of the pollutants are graphically presented in the App<br><br>- direct map access and current available data for most of the all world's countries<br><br>- -languages available on the website: English, Chinese, Japanese, Spanish, Korean, Russian, Traditional Chinese, French, Polish, German, Portuguese, Vietnamese<br><br>-number of installs: 100,000 - 500,000 |
| | Model's disadvantages: | -information only about the air pollutants emission, GHG emission is not included |

- ***AirVisual***

  Website: https://www.airvisual.com/

  Mobile App: https://play.google.com/store/apps/details?id=com.airvisual&hl=en

  *AirVisual is a tool that provides air quality data aggregated from the world's air quality database across over 9000 cities globally. The AirVisual's international team is part of IQAir company, based in Switzerland, specialized in technology solutions for air pollution protection.*

| | |
|---|---|
| Launch year: | 2015 |
| Data available for countries: | All |
| Data used in the model: | Local monitoring data |
| Model's advantages: | -visually attractive mobile application and website |

| | | |
|---|---|---|
| | | -fully informative App<br><br>- direct map access and current available data for most of the all world's countries<br><br>- two types of air quality maps: AQI stations map and AirVisual Earth<br><br>-information about the current AQI, current concentrations of $PM_{2.5}$, $PM_{10}$, $O_3$, $NO_2$, $SO_2$, CO<br><br>- displayed main pollutant concentration<br><br>-current meteorological information i.e. temperature, pressure, humidity and wind flow velocity<br><br>- seven days AQI and weather forecast<br><br>-health recommendations for the current air quality statement<br><br>- historical hourly and daily graphic information of the AQI, $PM_{2.5}$, $PM_{10}$, $O_3$, $NO_2$, $SO_2$, CO available separately<br><br>-information for the location data source<br><br>-App section News & Ranking<br><br>• ranking list of world's cities and the current AQIs<br><br>• news about air pollution and its health and environment impact<br><br>• information about resources of GHG, Volatile Organic Compounds, Ammonia, $CO_2$, Black Carbon, $PM_{2.5}$, $PM_{10}$, CO, $NO_2$, $SO_2$, $O_3$ and "what pollution measures should I watch out for?"<br><br>-number of installs: 100,000 - 500,000 |
| | Model's disadvantages: | -information only about the air pollutants emission, GHG emission is not included |

- ***CityAir mobile app to express the public perception of the outdoor air quality at their location, EU***

  Website: https://www.nilu.no/Forsiden/tabid/41/language/en-GB/Default.aspx

  Mobile App: https://play.google.com/store/apps/details?id=io.cordova.CityAir

  *CityAir gives the user the possibility to rate the air quality in their immediate surrounding by using a code of four colours. This information will help to create a citizens air quality map, and answer the question, how do citizens perceive the air pollution in their city. The user can ALSO choose to download other users' perceptions reported through CityAir for the same day. The Mobile app does not estimate ambient air quality impact and GHG emissions.*

| | |
|---|---|
| Launch year: | 2012-2016 part of the CITI-SENSE project |
| Data available for countries: | EU countries (not found information for the countries) |
| Data used in the model: | (not found) |
| Model's advantages: | Model's advantages: -the App is available in the following languages: English, Norwegian, Spanish, Catalan, Serbian, Czech, Slovenian<br><br>Personal information (gender, year of birth and education level) needed for statistical purposes.<br><br>The users contribute to the creation of the air quality map by user's report of the personal air quality perception and opinion.<br><br>Four available selections by color of air quality rate:<br>• Green – the air quality is very good<br>• Yellow – the air quality is good<br>• Orange – the air quality id poor<br>• Red – the air quality is very poor<br><br>Number of mobile app installs is more than 1,000. |
| Model's disadvantages: | |

- ***Plume Air Report – Live and forecast smog reports***

*The application is developed for the users in order to reduce the risk of peak times exposure. The Plume Air Report is created by Plume Labs and is available in 150 cities around the world.*

Website: **https://plumelabs.com/en/products/air-report**

Mobile App: **https://play.google.com/store/apps/details?id=com.plumelabs.air**

| | |
|---|---|
| Launch year: | 2015 |
| Data available for countries: | All |
| Data used in the model: | Satellites Data<br>Data from Air Monitoring stations<br>Meteorological Data<br>"Plume's" forecasting algorithms to predict real-time pollution levels |
| Model's advantages: | Visually attractive mobile application and website<br>-information about the current AQI, current concentrations of $PM_{2.5}$, $PM_{10}$, $NO_2$, and $O_3$<br>-current meteorological information i.e. temperature, pressure, humidity and wind flow velocity and direction<br>-meteorological forecasts and air quality data for the upcoming 24 hours<br>- historical hourly and daily information of the AQI and $PM_{2.5}$, $PM_{10}$, $NO_2$, and $O_3$ concentration levels<br>-available options for the use of different units:<br>• AQI (Plume AQI, AQI (USA), CAQI (Europe), AQI (China)<br>• Pollutant unit (Selected AQI, Physical units)<br>• Temperature (Celsius, Fahrenheit)<br>• Wind speed (kilometers per hour, mile per hour)<br>-notifications: |

| | | |
|---|---|---|
| | | • City notifications<br>• Smart notifications – tips and alerts when it matters<br>• Morning report – start the day ahead of pollution<br>• Evening report – go to bed in the know<br>-world air map with air plume index in seven different color statements<br>-Plume Labs blog - information about the air quality, air pollution, and health advice<br>-number of installs: 100,000 + |
| | Model's disadvantages: | - information only about the air pollutants emission of $PM_{2.5}$, $PM_{10}$, $NO_2$, and $O_3$<br>- $SO_2$, CO and GHG emissions are not included |

***New Entrants:***

***Potential ICARUS user-centric tools new entrants:***

- ***Mobile app calculator of pollution impacts from travel, EU***

  Website: http://www.claircity.eu/game-app/

  *The tool (currently under design, will be launched in Spring 2018.) will be an app for smartphone users. The ClairCity app is aimed at organisations and employees, encouraging businesses and other organisations to identify how travel impacts their efficiency and staff wellbeing. For individual users, once the app is downloaded they can choose whether to interact with it to understand their personal air pollution exposure and health impacts. The app data will be also used to demonstrate the impact of pollution on all our lives and help city policymakers plan a better future for each partner city of the EU project.*

- ***Computer Game for people involved in finding solutions for their city regarding air pollution and climate change***

  Website: http://www.claircity.eu/game-app/

*The awareness tool (currently under design, will be launched in Spring 2018.) will be a computer game not only for fun: the data used to build the game is real, so player decisions will show the real impact of different choices. The solutions and winning strategies that players find will "crowdsource" future scenarios for the city. The data used to build the game – from the impact of building new roads, through to the average life expectancy of citizens – is real.*

**Substitutes:**

***Potential ICARUS user-centric tools substitutes:***

At the point of submission of this interim business plan, no substitute products to the ICARUS UCT integrated solution have been identified. Substitutes performing similar functions to the

***Suppliers:***

***Potential ICARUS user-centric tools suppliers:*** All ICARUS UCT suppliers are members of the ICARUS team/consortium. ICARUS UCT can be characterized as an in-house product. The only external supplier is the cloud server and the Android and iOS application marketplaces.

***Buyers****:*

***Potential ICARUS user-centric tools buyers:***

- *Citizens*
- *Cities and NGOs*
- *Large companies*
- *Companies with an operational program on Corporate Social Responsibility (CSR)*
- *Companies with operational program certified under ISO 14001*
- *Mobile phone network operators*
- *Tourist operators*
- *Community groups*

| UCT | Sectors included A | AP data B | GHG data C | Emission reduction advice D | Additional advice E | Meteo data F | Input data G | Users data H | Free for the end-users I | Web-based platform J | Smart device friendly K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ICARUS UCT | + | + | + | + | + | - | + | + | + | + | + |
| CoolClimate Carbon Footprint Calculator | + | - | + | + | - | - | - | + | + | + | - |
| Carbon Footprint | + | - | + | - | - | - | + | + | + | + | - |
| WWF'S Footprint Calculator | + | - | + | - (registration required) | - | - | + | + | + | + | - |
| BreezoMeter | + | + | - | + | + | - | + | + | + | + | + |
| hackAIR | + | + | - | - | - | - | - | + | + | - | + |
| EuropeAir | + | + | - | - | + | - | + | + | + | + | + |
| AirVisual | + | + | - | + | + | + | + | + | + | + | + |
| Plume Air Report | + | + | - | + | + | + | + | + | + | + | + |

A – the tool includes following sectors: transport sector, home energy, waste, food consumptions, services and goods expenses
B – air pollutants emission data are taken into consideration by the tool
C – greenhouse gases emission data are obtained in the tool
D - the tool includes emission reduction advices for the users
E – information about the air pollutants or GHG emission, health impact, climate change are available in the tool
F – meteorological data are included in the tool
G – personal input information is not required to use the tool
H – users can integrate their own data
I – the tool is available and free to use for the citizens
J – the tool is available on internet
K – the tool is customized for mobile and tablet use, available as an Android and iOS application

### 3.3.2 Potential collaborations

***Potential ICARUS user-centric tools collaborations:***

- ***EuropeAir – Air Quality Europe, EU***

  Website: http://airindex.eea.europa.eu/

  Mobile App: https://play.google.com/store/apps/details?id=com.girosystem.europeair&hl=en

  *EuropeAir provides information about the air pollutants concentration based on the last air quality data statement from the monitoring stations in the European countries. The air quality data that EuropeAir disposes could help the ICARUS tool in creating the air quality improvement strategies. This could lead to a possible collaboration between the ICARUS UCT and the EuropeAir tool.*

- ***AirVisual***

  Website: https://www.airvisual.com/

  Mobile App: https://play.google.com/store/apps/details?id=com.airvisual&hl=en

  *AirVisual provides air quality data aggregated from the world's air quality database. This tool has a direct map access with AQ data for most of the all world's countries. The AirVisual application is fully informative including AQI, current concentrations of $PM_{2.5}$, $PM_{10}$, $O_3$, $NO_2$, $SO_2$, CO, seven days forecast as well as historical hourly and daily graphic information. In the tool is included information about the emission data source for the chosen city and health recommendations for the current air quality statement.*

Due to the features with which this tool disposes, it can be stated that AirVisual tool stands out from the other competitors and that can be used as a good collaborator of the ICARUS UCT.

In addition, it is foreseen that interaction with the CLAiR-CITY (Citizen-led air pollution reduction in cities) Horizon 2020 project with regard to the mobile app will be investigated.

## 3.4 SWOT analysis

| S<br>STRENGTHS | W<br>WEAKNESSES |
|---|---|
| ▪ The user-centric tools provide personalized information to the user, based on their location and activities<br>▪ Enable corporations and administrative bodies to offer rewards based on proven behavioural change<br>▪ Gamification | ▪ We rely on corporations and administrative bodies for rewards other than ethical |
| **O**<br>OPPORTUNITIES | **T**<br>THREATS |
| ▪ Take advantage of the increasing popularity of environmental awareness<br>▪ Common interests with environment-friendly products manufacturers<br>▪ Participating administrative bodies and corporations have interest into promoting the user-centric tools | ▪ Own tools or other campaigns developed by large corporations |

## 3.5 Investment / Projections

The commercialisation of the User-centric tools (UCT) is a complex process involving different steps. The first step is to understand the potential market for the UCT, as well as to understand the intellectual properties and various patents. Developing tools as good as possible within the current resource constraints is a next step that should be followed. Moreover, drafting a business plan is vital for the commercialisation procedure. Furthermore, the demonstration of UCT to potentially interested organizations will provide valuable feedback to the process and will reveal potential bugs and/or improvements to be addressed before production phase. Lastly, promoting and disseminating the UCT is a vital step before its actual launch.

Following, we present our preliminary financial plan, based on some assumptions regarding costs and market share. The financial figures provided in this section should be interpreted as first estimates, which may be subjected to modifications during the implementation phase of the project and of the IT tools.

Our business plan is based on two main income sources:

- **License fee**: This is for the use of the UCT by organizations and is charged on a monthly basis. The cost of the license fee will be 100€ / month. Note that the UCT will be offered for free to the end-users.
- **Ads**: Ads can be displayed in the UCT website / mobile app, as a supplemental income source. Our projections are based on the following averages

| | |
|---|---|
| PPC (Pay-per-click) | 2.15 € |
| CPM (Cost-per-1K-views) | 2.80 € |
| CTR (Click-through-rate) | 0.50% |

Table 7**: Variables for estimating ads revenue**

We also base our projected income on the following assumptions, regarding the total projected impressions and licenses:

Assumptions

| | 2021 | 2022 | 2023 | 2024 | |
|---|---|---|---|---|---|
| Projected Impressions | 100,000.00 | 146,410.00 | 214,358.88 | 313,842.84 | Q1 |
| | 110,000.00 | 161,051.00 | 235,794.77 | 345,227.12 | Q2 |
| | 121,000.00 | 177,156.10 | 259,374.25 | 379,749.83 | Q3 |
| | 133,100.00 | 194,871.71 | 285,311.67 | 417,724.82 | Q4 |
| | 464,100.00 | 679,488.81 | 994,839.57 | 1,456,544.61 | |
| Projected Licenses | 50.00 | 62.00 | 78.00 | 97.00 | Q1 |
| | 53.00 | 66.00 | 82.00 | 102.00 | Q2 |
| | 56.00 | 70.00 | 87.00 | 108.00 | Q3 |
| | 59.00 | 74.00 | 92.00 | 114.00 | Q4 |
| | 218.00 | 272.00 | 339.00 | 421.00 | |

Table 8**: Assumptions for the UPC financial plan**

So, according to these assumptions, our projected income for the 4 years following the end of the project is as follows:

Income Projection

| | 2021 | 2022 | 2023 | 2024 | |
|---|---|---|---|---|---|
| Income from Ads | 1,355.00 € | 1,983.86 € | 2,904.56 € | 4,252.57 € | Q1 |
| | 1,490.50 € | 2,182.24 € | 3,195.02 € | 4,677.83 € | Q2 |
| | 1,639.55 € | 2,400.47 € | 3,514.52 € | 5,145.61 € | Q3 |
| | 1,803.51 € | 2,640.51 € | 3,865.97 € | 5,660.17 € | Q4 |
| | 6,288.56 € | 9,207.07 € | 13,480.08 € | 19,736.18 € | |
| License Fees | 5,000.00 € | 6,200.00 € | 7,800.00 € | 9,700.00 € | Q1 |
| | 5,300.00 € | 6,600.00 € | 8,200.00 € | 10,200.00 € | Q2 |
| | 5,600.00 € | 7,000.00 € | 8,700.00 € | 10,800.00 € | Q3 |
| | 5,900.00 € | 7,400.00 € | 9,200.00 € | 11,400.00 € | Q4 |
| | 21,800.00 € | 27,200.00 € | 33,900.00 € | 42,100.00 € | |
| Totals | 28,088.56 € | 36,407.07 € | 47,380.08 € | 61,836.18 € | |

Table 9**: Income projection for UPC**

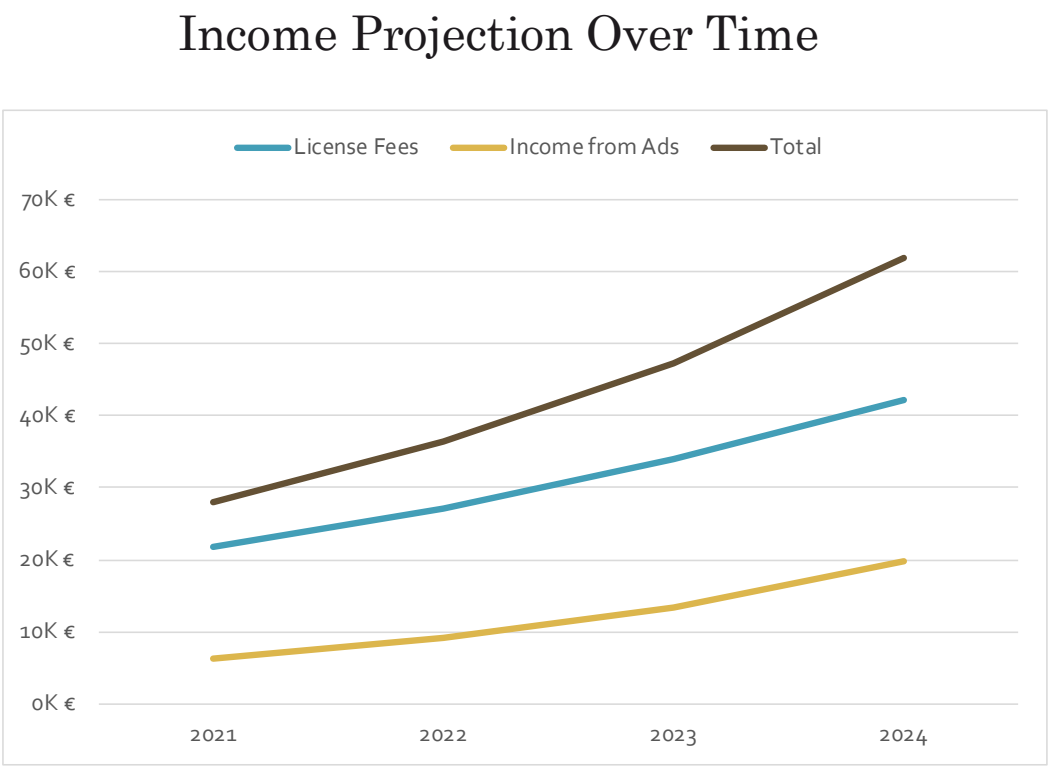


Figure 7**: Projected income over time for UCT**

Regarding the expenses of the UCT, we identify 2 different types of expenses:

- **Technical support expenses**: These expenses include issue tracking, bug fixing and even the implementation of new features. We assume 1 developer working full-time on technical support.
- **Operational expenses**: These are regular recurring operational expenses.

Expenses Projection

| | 2021 | 2022 | 2023 | 2024 | |
|---|---|---|---|---|---|
| Texchical Support Expenses | 7,500.00 € | 7,500.00 € | 7,500.00 € | 7,500.00 € | Q1 |
| | 7,500.00 € | 7,500.00 € | 7,500.00 € | 7,500.00 € | Q2 |
| | 7,500.00 € | 7,500.00 € | 7,500.00 € | 7,500.00 € | Q3 |
| | 7,500.00 € | 7,500.00 € | 7,500.00 € | 7,500.00 € | Q4 |
| | 30,000.00 € | 30,000.00 € | 30,000.00 € | 30,000.00 € | |
| Operational Expenses | 3,000.00 € | 3,000.00 € | 3,000.00 € | 3,000.00 € | Q1 |
| | 3,000.00 € | 3,000.00 € | 3,000.00 € | 3,000.00 € | Q2 |
| | 3,000.00 € | 3,000.00 € | 3,000.00 € | 3,000.00 € | Q3 |
| | 3,000.00 € | 3,000.00 € | 3,000.00 € | 3,000.00 € | Q4 |
| | 12,000.00 € | 12,000.00 € | 12,000.00 € | 12,000.00 € | |
| Totals | 42,000.00 € | 42,000.00 € | 42,000.00 € | 42,000.00 € | |

Table 10**: Expenses projection for UCT**

The following figures show the projected expenses over time, along with a breakdown of the expenses according to their category.

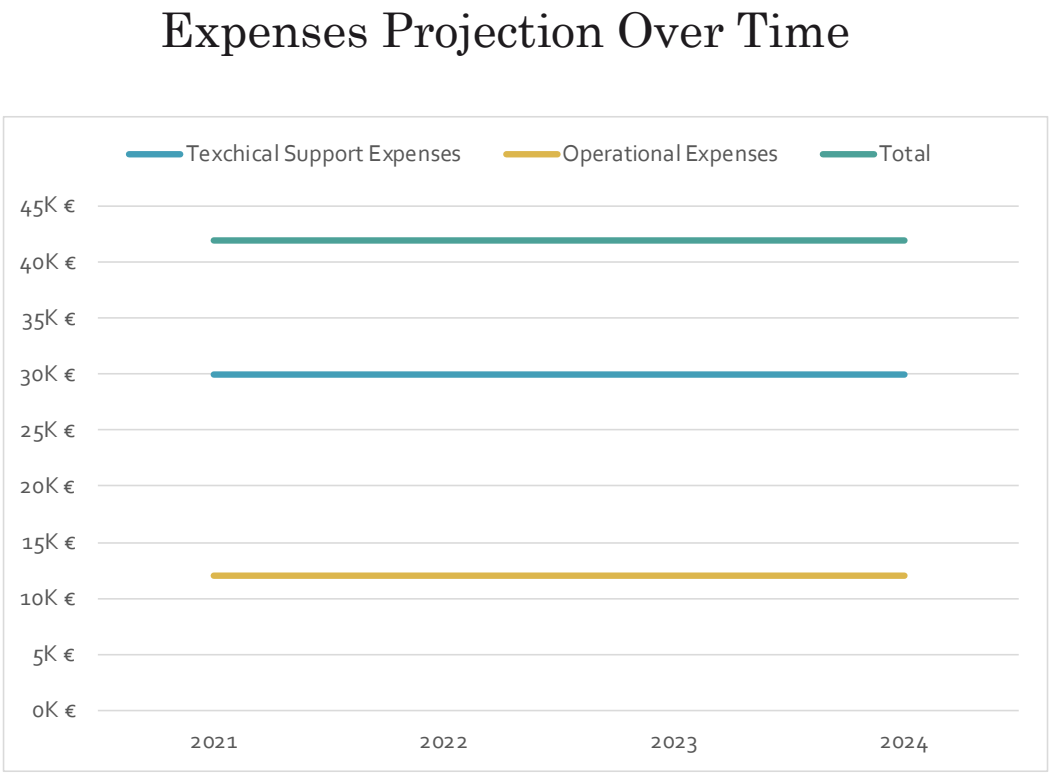


Figure 8**: Projected expenses over time for UCT**

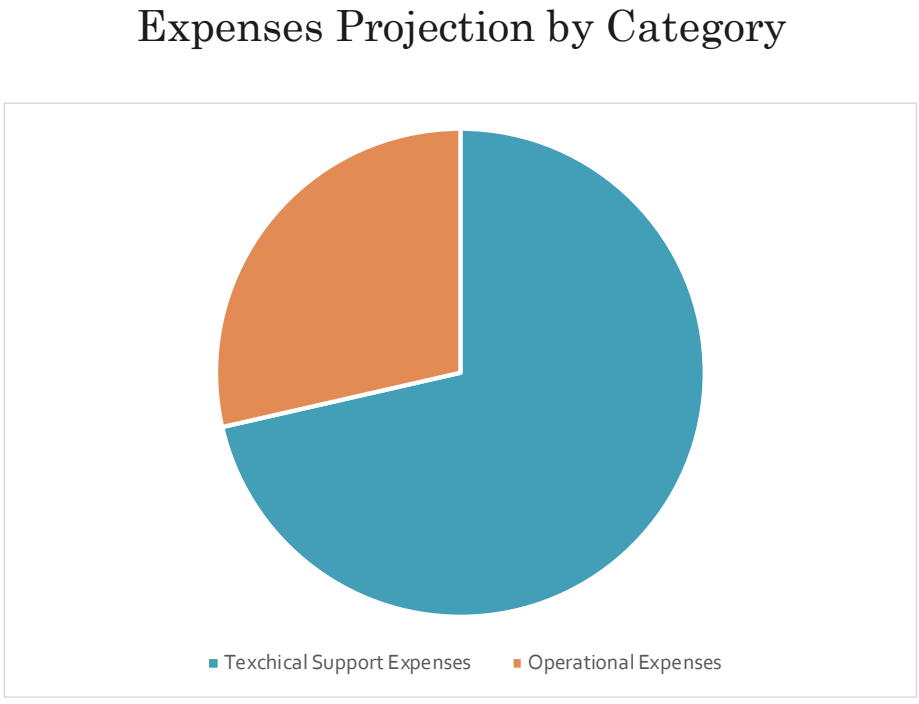


Figure 9**: Projected expenses by category for UCT**

Finally, having estimated the gross income and the total expenses, we can conclude on the following net profit, as summarized by the next table and figures:

Summary

| | 2021 | 2022 | 2023 | 2024 |
|---|---|---|---|---|
| **Gross Income** | **28,088.56 €** | **36,407.07 €** | **47,380.08 €** | **61,836.18 €** |
| Income from ads | 6,288.56 € | 9,207.07 € | 13,480.08 € | 19,736.18 € |
| License fees | 21,800.00 € | 27,200.00 € | 33,900.00 € | 42,100.00 € |
| **Total Expenses** | **42,000.00 €** | **42,000.00 €** | **42,000.00 €** | **42,000.00 €** |
| Tchnical support expenses | 30,000.00 € | 30,000.00 € | 30,000.00 € | 30,000.00 € |
| Operational expenses | 12,000.00 € | 12,000.00 € | 12,000.00 € | 12,000.00 € |
| **Net Profit** | **-13,911.45 €** | **-5,592.93 €** | **5,380.08 €** | **19,836.18 €** |

Table 11: **Net profit for UCT**

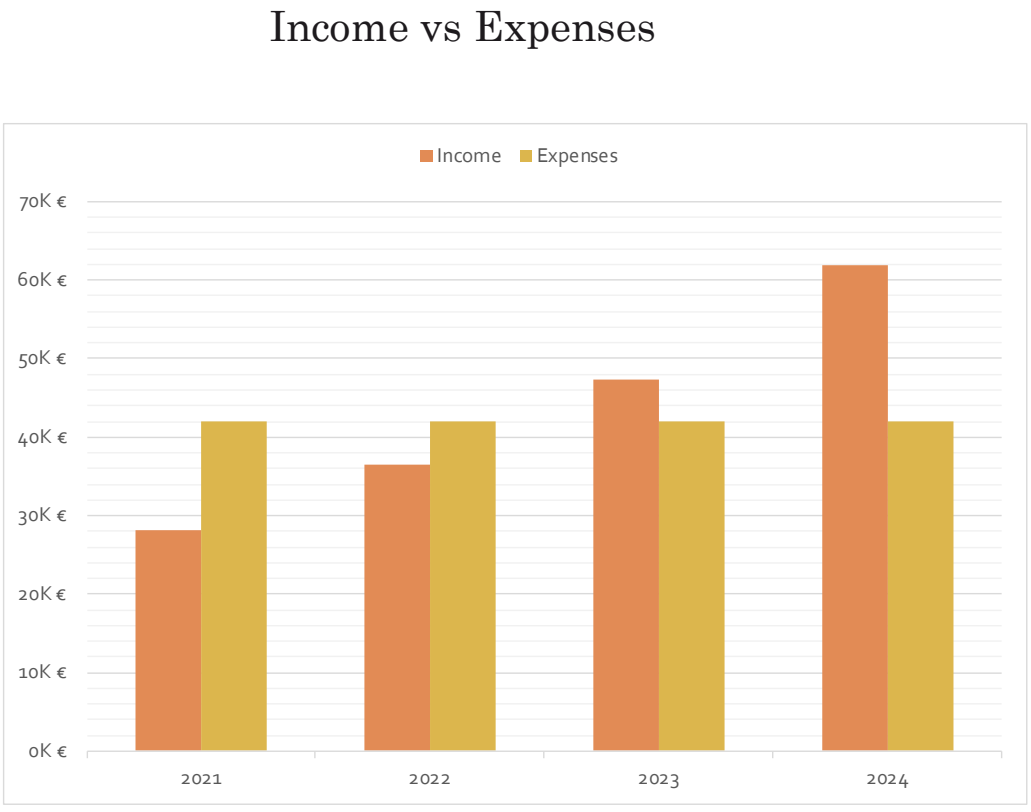


Figure 10: **Income vs expenses for UCT**

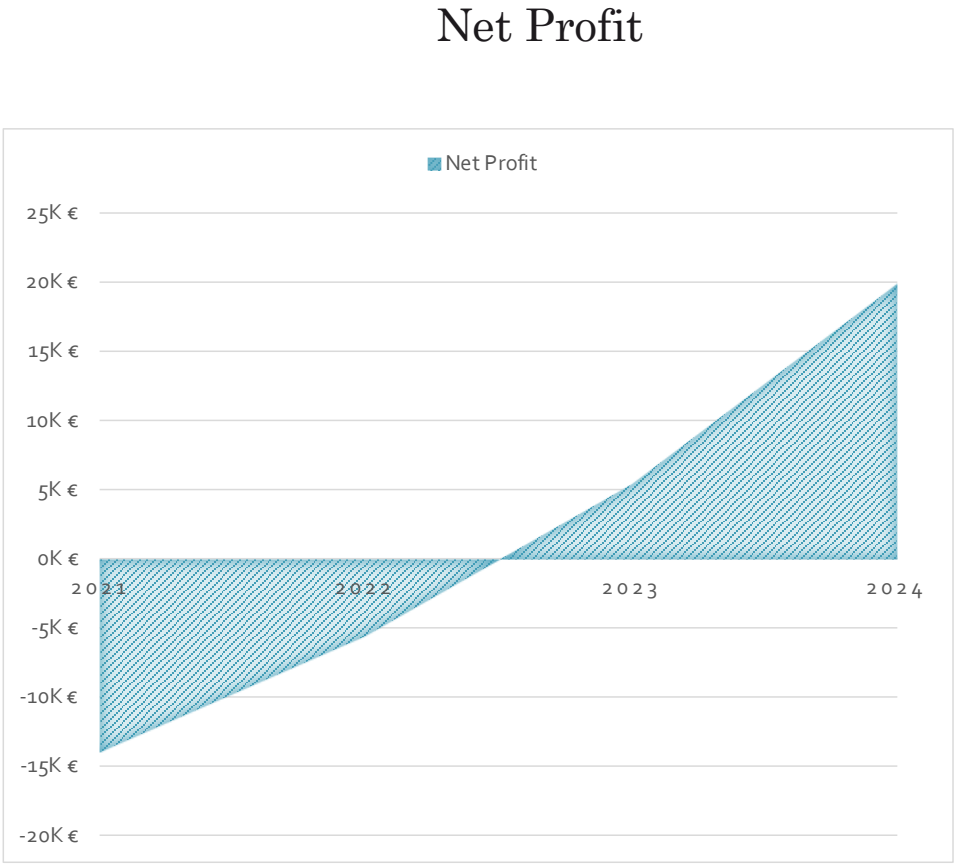


Figure 11**: Net profit for UCT**

## 3.6 Strategy and implementation of the exploitation plan

### 3.6.1 Lean Canvas

<table>
<tr>
<td rowspan="2">Problem<br>- Citizens do not have information of their behavior impact to their environment.<br>- Citizens are not informed on the impact of AQ on their lives<br>- Citizens are not motivated towards environment-friendly behaviors<br><br>Alternative Solutions<br>- Information derives from media and bibliography<br>- Motivation derives only through sensitization</td>
<td>Solution<br>- Provide quantitative data of user behavior based<br>- Provide health impact based on the region and the habits<br>- Sensitize and reward based on proven behavioral change</td>
<td rowspan="2">Unique Value Proposition<br>- Provide personalized advice based on user location and activities<br>- Give rewards based on proven behavioral change</td>
<td>Unfair Advantage<br>- Provide proven information on environment-friendly behavior</td>
<td rowspan="2">Customer Segments<br>- Public and private companies having direct interest (public transportation, environmental solution manufacturers etc.)<br>- Pollutants and corporations as part of their CSR polices<br>- Citizens<br><br>Early adopters<br>- Authorities, companies and citizens with a high environmental sensitization</td>
</tr>
<tr>
<td>Key Metrics<br>- Number of downloads<br>- Number of licenses bought<br>- Usage data/rewards offered</td>
<td>Channels<br>- Fora and consortia (such as the Covenant of Mayors)<br>- Advertising<br>- End-users: via the participating companies and authority channels</td>
</tr>
<tr>
<td colspan="3">Cost Structure<br>Fixed: Salaries<br>Variable: Marketing, advertising, customer support</td>
<td colspan="2">Revenue Streams<br>- Licenses<br>- Number of end-users interested/having taken advantage of the rewards of each participating entity [to be discussed]</td>
</tr>
</table>

# 4 Joint exploitation plan

For this chapter, only limited information can be provided at this early stage, since the partners' approach to the joint exploitation will be concluded in detail later on.

## 4.1 Introduction

The commercialization and the exploitation of ICARUS DSS and UCT requires expertise in several different domains, such as:

- Air quality and climate change
- Emission and atmospheric modelling
- Drafting of environmental policies
- (Web)GIS
- In-depth knowledge of cloud infrastructure
- Marketing

The combined knowledge of all the above is necessary for a successful creation and commercialization of a "real-world" product. In order to achieve this, a collaboration among all the involved partners is considered necessary.

For the time being, the involved partners are processing ways and strategies on how a joint collaboration can be achieved in a productive and efficient way.

# 5 Conclusions

In this deliverable a thorough market analysis has been achieved, by analyzing numerous existing or potential competitive solutions to both proposed products. This analysis has offered the partners a good insight of the status of the relative markets. At the same time a few opportunities for collaborations have also immerged. The main advantages and disadvantages have been put in evidence. The main features offered by the proposed products and the competitive solutions have been juxtaposed for both the DSS and the UCT, in an attempt to assess their competitive advantage and to identify aspects that could be improved.

A first approach to a financial plan has been attempted, but with several assumptions for factors that are not known yet at this stage. This assessment, however, will help the involved partners identify the aspects that require more attention and those that should be re-evaluated.

At the end, it is believed that this document is a well-advanced approach for an interim business plan and a good and solid basis for future work. Some attention will be required in the future to the investment plans. The market evolution should be followed periodically and the joint exploitation plan must be elaborated close to the end of the project.

# 6 References


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